

*Elko* patent), and dependent claims 2-4, 7, 12-13, 18, and 22-23 as either anticipated by the *Elko* patent or unpatentable under 35 U.S.C. § 103 over the *Elko* patent. In addition, the Examiner objected to claims 5-6, 8-10, 14-17, and 19-21 as dependent on a rejected base claim, but would allow such claims if rewritten in independent form.

In response to this rejection, Applicants have amended the rejected claims to more clearly distinguish the claimed invention from the *Elko* patent. Applicants respectfully request reconsideration of this Application in light of the amendments above and these remarks.<sup>1</sup>

### **The Claims Are Patentable Over Elko**

The *Elko* patent concerns a microphone array and signal processing arrangement for focusing the array's main response lobe to cover a predetermined location of a desired acoustic source. Further, the arrangement dynamically adjusts the direction of response pattern nulls toward sources of unwanted noise to reduce the effects of noise on array output.<sup>2</sup>

According to the *Elko* patent, the location of the desired source of sound must be *predetermined*. This predetermined location is manually provided to the arrangement by the system operator prior to each use of the system (unless the location of the desired source of sound never changes with respect to the array, in which case the predetermined location of the source can be stored once).<sup>3</sup> Given the predetermined location of the desired source, the arrangement adapts the array response (*i.e.*, the direction of nulls) to reduce the noise contribution to array output.

It is important to note that the *Elko* patent requires that the location of the desired source be determined prior (*i.e.*, predetermined) to the dynamic adjustment of the array response to noise sources. That is, the *Elko* patent *expects* the desired source to remain fixed in its predetermined location. If the source moves from its predetermined

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1. At this point in prosecution, Applicants wish to seek protection for all claims, including those claims which presently stand rejected prior to this Amendment. However, Applicants wish to thank the Examiner for his indication of allowable subject matter in claims 5-6, 8-10, 14-17, and 19-21.
  2. See the *Elko* patent, col. 4, lines 44-49.
  3. See the *Elko* patent, col. 3, lines 52-56 and col. 8, lines 38-44.

location, performance of the arrangement can degrade.

In contrast to the teaching of the *Elko* patent, the present invention, as claimed, provides for dynamic adjustment of array response nulls without requiring knowledge of a predetermined location for the desired source. Independent claims 1 and 11 have been clarified to make this distinction clear.

Each of the independent claims now states that dynamic adjustment of null location is performed

under a constraint that the null be *precluded from being* located within a predetermined region of space *which comprises a range of directions about the array, which range reflects a predetermined directional variability of the desired acoustic energy with respect to the array.*

Thus the claims now recite a "*predetermined directional variability* of the desired acoustic energy" as a predicate to array response adjustment. No such predetermined directional variability is shown by the *Elko* patent. According to the present invention, the predetermined directional variability of a desired source defines a range of directions where the source is allowed to roam. This range is taken into account during dynamic adjustment of the array response for noise reduction. That is, the claims recite that the evaluation of parameters is "performed under a constraint that the null be precluded from ... a predetermined region of space." Thus, contrary to the teaching of the *Elko* patent, the present invention can dynamically reduce noise under conditions where the desired source is *moving*. As such the claims are not anticipated by the *Elko* patent.

Not only does *Elko* patent fail to anticipate this aspect of the present invention, the *Elko* patent does not even suggest the claimed invention. This is because the *Elko* patent's expectation that a source will remain in a *fixed location* in no way suggests the claimed arrangement which calls for the *opposite* of this constraint. Accordingly, the *Elko* patent teaches away from the amended claims.

Since all dependent claims include the limitation of a "predetermined directional variability," all such claims are patentable over the *Elko* reference for at least the same reason.

#### **Other Amendments**

The independent claims have also been amended to further clarify the recited subject matter. These amendments are not made in response to the rejection by the Examiner. The claims now state that the realized angular orientation of a directivity

pattern null provides a reduced array output signal level "in accordance with a criterion." Illustratively, this criterion is disclosed in the specification as a minimization of array output signal level. However, persons of ordinary skill in the art will be able to devise other criteria against which array output will be reduced in accordance with the invention. Applicants respectfully submit that the added language does not restrict the scope of the claim, but rather improves the description of the claimed subject matter.

### Conclusion

Applicants respectfully submit that the claims distinguish over the cited reference and are thus in condition for allowance. Should the Examiner have any questions or comments concerning this Amendment, he is invited to contact the Applicants' Attorney at the Examiner's convenience.

Respectfully,  
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Date: 4/25/95